

# 5

Treatment Manual

## Treatment Schedules

### *T300 - Schedules for Miscellaneous Plant Products*

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**Important**

Exposure period may be extended for any commodity which *cannot* be used for food or propagation. This extension is only a matter of convenience for the importer and is intended only for the purpose of reducing treatment costs. The request for extension must come from the importer or his authorized representative and should be confirmed in writing. A letter is not required for each treatment. A single blanket request should be considered as acceptable and renewed each year as required.

During the extended exposure period, the concentrations must remain stable and the prescribed minimums be met at the end of the extension. Otherwise, the treatment may be voided and retreatment required. Examples of commodities for which extended exposure periods may be approved include: cotton piece goods, baled cotton, bagging, wood, marble, soil as such, etc. Examples of commodities for which *no* extension may be approved include: cottonseed, grain, tobacco, etc. An extension of exposure period for other purposes is not permitted except as may be prescribed in various schedules for concentration readings below minimum.

Additional safety precautions, including additional aeration, may be required because of the extended exposure period. The PPQ officer or the commercial fumigator will specify any needed precautions.

## T301—Cotton and Cotton Products

### T301-a-3 Baled lint or linters

Pest: ***Pectinophora*** spp.

Treatment: T301-a-3 MB (“Q” label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	12 hrs	24 hrs
40 °F or above	7 lbs	84	60	30	—
OR	4 lbs	60	40	—	20

### T301-b-1-1 Baled lint, linters, waste, piece goods, gin trash

Two alternative treatments

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T301-b-1-1 MB (“Q” label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:		
		0.5 hr	2 hrs	24 hrs *
60 °F or above	8 lbs	96	64	35
40-59 °F	11 lbs	132	88	50

\* In addition to the space concentration readings, you must take a commodity concentration reading. The minimum concentration reading for commodity reading is as follows: For 60 °F or above—25 oz.; for 40-59 °F—30 oz.



**Important**

Load limit is 50 percent of chamber volume. Concentration readings may be omitted for chamber fumigations.

### T301-b-1-2 Baled lint, linters, waste, piece goods, gin trash

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T301-b-1-2 MB (“Q” label only) at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs

### T301-a-7 Cottonseed (samples and bulk)

Pest: ***Pectinophora*** spp.

Treatment: T301-a-7 Acid delinting and heat treatment (alternative treatment)

Cottonseed delinting is primarily intended for the elimination of surface-borne disease organisms. It is also effective against insects. To be completely effective against insects, this treatment must be carried out at approximately 145 °F (by the application of sufficient heat to the seed, or acid, or both) or by raising the temperature of the delinted seed during the subsequent drying process to 145 °F for a period of not less than 45 seconds or at least 140 °F for a period of not less than 8 minutes.



This treatment schedule is not applicable to cottonseed infested with boll weevil, *Anthonomus grandis*.

Also, this treatment largely destroys the cottonseed's ability to germinate.

## T301-b-2

### Cottonseed, cottonseed products, or samples

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T301-b-2 MB ("Q" label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:		
		0.5 hr	2 hrs	12 hrs
90 °F or above	2.5 lbs	30	20	15
80-89 °F	3.5 lbs	42	30	20

The sorptive rates of commodities vary. When a commodity is known or suspected to be sorptive, take more T/C readings than normal. Additional fumigant is added as prescribed on [page-2-4-24](#).



Items known to be sorptive or items whose sorptive properties are unknown are not to be fumigated in chambers at NAP unless T/C readings are taken.

When both woodborers and khapra beetles are involved, use schedule T404-d.



Cottonseed products (other than cottonseed) treated under this schedule are not to be used for food or feed.

## T301-b-3

### Cottonseed meal

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T301-b-3 MB ("Q" label only) at NAP



**Important**

Concentration readings should be obtained within the commodity.  
Concentration readings not required for chamber fumigations.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2 hrs	24* hrs	28* hrs	32* hrs
90 °F or above	4 lbs	48	32	25	—	—
89-89 °F	6 lbs	72	48	30	—	—
70-79 °F	8 lbs	96	64	35	—	—

\*In addition to the space concentration readings, you must take a commodity concentration reading. The minimum concentration reading for commodity reading is as follows: For 90-96 °F—10 oz.; for 80-89 °F—15 oz.; and for 70-79 °F—20 oz.

\*\*Optional



**Important**

Cottonseed meal treated with this schedule is not to be used for food or feed.

## T301-c

### Cotton and cotton products

Pest: *Globodera rostochiensis* (golden nematode)

Treatment: T301-c MB (“Q” label) at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
40 °F or above	8 lbs	16 hrs
	10.5 lbs	12 hrs

## T301-d-1-1

### Cotton and cotton products

Two alternative treatments

Pest: *Anthonomus grandis* (boll weevil)

Treatment: T301-d-1-1 MB (“Q” label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2 hrs	3 hrs	4 hrs	8 hrs
90 °F or above	2.5 lbs	30	20	—	—	—
80-89 °F	3 lbs	36	28	—	—	—
70-79 °F	4 lbs	48	36	—	—	—
60-69 °F	4 lbs	50	—	34	—	—
55-59 °F	5 lbs	64	—	48	—	—
50-54 °F	5.5 lbs	70	—	—	50	—
40-49 °F	6 lbs	80	—	—	54	40

## T301-d-1-2

### Cotton and cotton products

Pest: *Anthonomus grandis* (boll weevil)

Treatment: T301-d-1-2 Phosphine at NAP—tarpaulin or chamber

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ppm) At 72 hours:
50 °F or above	36 g*	225**

\*36g/1,000ft<sup>3</sup> (28.3m<sup>3</sup>) is equivalent to 1.27 g/m<sup>3</sup>.

\*\*An average reading with no reading less than 50 ppm.



Important

Refer to the Equipment Section for a description of the MityVac pump and the Port-a-sens phosphine detector.



Important

Refer to [Table 5-4-1 on page 5-4-29](#) for data on amount of phosphine liberated by various products.

## T301-a-1-1

### Lint, linters, cottonseed, cottonseed hulls, gin trash, waste, cottonseed meal, or other baled or bulk commodities (except samples)

Pest: *Pectinophora* spp.

Treatment: T301-a-1-1 MB (“Q” label only) at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> ) for:		Exposure Period
	Bulk shipments	Other than bulk shipments	
60 °F or above	6 lbs	6 lbs	12 hrs
OR	4 lbs	3 lbs	24 hrs
40-59 °F	7 lbs	7 lbs	12 hrs
OR	5 lbs	4 lbs	24 hrs

## T301-a-1-2

### Lint, linters, cottonseed, cottonseed hulls, gin trash, waste, cottonseed meal, or other baled or bulk commodities (except samples)

Pest: *Pectinophora* spp.

Treatment: T301-a-1-2 MB (“Q” label only) in 26" vacuum—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs



For propagative seed cotton, refer to T203-f-1 through T203-f-4.

### T301-a-6

#### **Lint, linters, and cottonseed (bulk, sacked, or packaged cottonseed, lint or linters, cottonseed hulls, gin trash, and all other baled or bulk cotton commodities)**

Pest: ***Pectinophora*** spp.

Treatment: T301-a-6 Phosphine at NAP

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ppm) At:	
		72 hrs	120 hrs
50 °F or above	60 g*	225**	50***

\* 60 g/1,000ft<sup>3</sup> (28.3m<sup>3</sup>) is equivalent to 2.1g/m<sup>3</sup>.

\*\* An average reading with no reading less than 50 ppm.

\*\*\*An average of 50 PPM or more.

Aerate commodity 24 hours and/or make appropriate tests for presence of gas.



Refer to [Table 5-4-1 on page-5-4-29](#) for data on amount of phosphine liberated by various products.  
Refer to the Equipment Section for a description of the MityVac pump and the Port-a-sens phosphine detector.

### T301-a-2

#### **Lint (except baled lint or linters), cottonseed (except packaged cottonseed), cottonseed hulls, gin trash, waste, cottonseed meal, or other baled or bulk commodities (excluding samples)**

Pest: ***Pectinophora*** spp.

Treatment: T301-a-2 MB (“Q” label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	12 hrs	24 hrs
40 °F or above	7 lbs	84	60	30	—
OR	5 lbs	60	40	—	20

## T301-a-4 Packaged cottonseed

Pest: ***Pectinophora*** spp.

Treatment: T301-a-4 MB ("Q" label only) at NAP—tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	12 hrs	24 hrs
40 °F or above	7 lbs	84	60	30	—
OR	5 lbs	60	40	—	20

## T301-a-5-1 Samples of cotton and cotton products

Two alternative treatments

Pest: ***Pectinophora*** spp.

Treatment: T301-a-5-1 MB at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
40 °F or above	3 lbs	24 hrs

## T301-a-5-2 Samples of cotton and cotton products

Pest: ***Pectinophora*** spp.

Treatment: T301-a-5-2 MB in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
40 °F or above	4 lbs	2 hrs

## T302—Grains and seeds Not Intended for Propagation



Important

If Grain and seeds for propagation, use appropriate treatment in T203 schedules

### T302-g-1

#### Acorns not intended for propagation

Two alternative treatments

Pest: *Cydia splendana* (nut fruit tortrix) and *Curculio* spp.  
(weevils)

Treatment: T302-g-1 MB at NAP—tarpaulin, chamber, or van container

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:					
		0.5 hr	2 hrs	3 hrs	4 hrs	5 hrs	6 hrs
90-95 °F	4 lbs	58	32	34	—	—	—
80-89 °F	4 lbs	58	32	—	34	—	—
70-79 °F	5 lbs	72	40	—	42	—	—
60-69 °F	5 lbs	72	40	—	—	40	—
50-59 °F	6 lbs	85	48	—	—	50	—
40-49 °F	6 lbs	85	48	—	—	—	48

### T302-g-2

#### Acorns not intended for propagation

Pest: *Cydia splendana* (nut fruit tortrix) and *Curculio* spp.  
(weevils)

Treatment: T302-g-2 MB in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80-96 °F	3 lbs	2 hrs
70-79 °F	4 lbs	2 hrs
60-69 °F	4 lbs	3 hrs
50-59 °F	4 lbs	4 hrs
40-49 °F	4 lbs	5 hrs



**Important**

Either T302-g-1 or T302-g-2 required from all countries except Canada and Mexico. Treated commodity not to be used for food or feed.

### T302-a-1-1

#### Ear corn

Two alternative treatments

Pest: Borers

Treatment: T302-a-1-1 MB at NAP—chamber only

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
70 °F or above	2 lbs	6 hrs

## T302-a-1-2

### Ear corn

Pest: Borers

Treatment: T302-a-1-2 Dry heat

168 °F minimum air temperature for not less than 2 hours; ears spread in single layers on slats or wire shelves.

## T302-c-1

### Grains and seeds not intended for propagation (e.g., guar “gum”)

Pest: *Trogoderma granarium* (Khapra beetle)

Treatment: MB (“Q” gas only) at NAP -- tarpaulin.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:		
		0.5 hr	2 hrs	12 hrs
90 °F or above	2.5 lbs	30	20	15
80-89 °F	3.5 lbs	42	30	20
70-79 F	4.5 lbs	54	40	25
60-69 F	6 lbs	72	50	30
50-59 F	7.5 lbs	90	60	35
40-49 F	9 lbs	108	70	40

The sorptive rates of commodities vary. When a commodity is known or suspected to be sorptive (see [T307-a](#)), take more T/C readings than normal. Additional fumigant is added as prescribed on [page-2-4-40](#).



Items known to be sorptive or items whose sorptive properties are unknown are not to be fumigated in chambers at NAP unless T/C readings are taken.

When both woodborers and khapra beetles are involved, use schedule T404-d.

## T302-c-2

### Grains and seeds not intended for propagation

NOTE: Load limit is 75 percent of chamber volume.

Pest: *Trogoderma granarium* (Khapra beetle)

Treatment: MB (“Q” label gas) in 26” vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs

### T302-c-3 Grains and seeds not intended for propagation (e.g., guar “gum”)

Pest: ***Trogoderma granarium*** (Khapra beetle)

Treatment: MB (“Q” gas only) in 26" vacuum- chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
90-96 °F	2.5 lbs	12 hrs
80-89 °F	3.5 lbs	12 hrs
70-79 °F	4.5 lbs	12 hrs
60-69 °F	6 lbs	12 hrs
50-59 °F	10 lbs	12 hrs
40-49 °F	12 lbs	12 hrs

The sorptive rates of commodities vary. When a commodity is known or suspected to be sorptive (see [T307-a](#)), take more T/C readings than normal. Additional fumigant is added as prescribed on [page-2-4-24](#).



Items known to be sorptive or items whose sorptive properties are unknown are not to be fumigated in chambers at NAP unless T/C readings are taken.

When both woodborers and khapra beetles are involved, use schedule T404-d.

### T302-d Grains and seeds not intended for propagation and contaminated with cotton seed

Pest: ***Pectinophora spp.***

Treatment: see Cotton and Cotton Products, [T301-a-1-1](#) or [T301-a-1-2](#)



Alternate method—screening for removal of cotton seed contamination.

### T302-e-1

#### Grains and seeds not intended for propagation

Two alternative treatments

Pest: Insects other than *Trogoderma granarium* (khapra beetle)

Treatment: T302-e-1 MB ("Q" label only) at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80-96 °F	2.5 lbs	2.5 hrs
70-79 °F	3 lbs	2.5 hrs
60-69 °F	3 lbs	3 hrs
50-59 °F	3 lbs	3.5 hrs
40-49 °F	3 lbs	4 hrs

### T302-e-2

#### Grains and seeds not intended for propagation

Pest: Insects other than *Trogoderma granarium* (khapra beetle)

Treatment: T302-e-2 MB ("Q" label only) at 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80-96 °F	2.5 lbs	2.5 hrs
70-79 °F	3 lbs	2.5 hrs
60-69 °F	3 lbs	3 hrs
50-59 °F	3 lbs	3.5 hrs
40-49 °F	3 lbs	4 hrs



Important

Load limit is 50 percent of chamber volume. This vacuum treatment primarily for material so packed or packaged as to make fumigant penetration questionable.

### T302-f

#### Grains and seeds (excluding Rosmarinus seed) not intended for propagation

Pest: Snails

Treatment: T302-f Mechanical separation by screening or hand removal. If not feasible, entry should be denied when snails are of agricultural or public health significance, or treat using appropriate schedule as listed in T403-a under Section 18 Exemption.



For *Rosmarinus* seed use T203-h

### **T302-b-1-1**

#### **Shelled corn**

Treatment: T302-b-1-1 ***Reserved***

### **T302-b-1-2**

#### **Shelled corn contaminated with cottonseed**

Pest: ***Pectinophora spp.***

Treatment: T302-b-1-2



see [T301-a-1-1](#) or [T301-a-1-2](#)



Shelled corn treated with T301 is not to be used for food or feed.

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## **T303—Rice Straw and Hulls**

### **T303-d-1**

#### **Articles made with rice straw**

Two alternative treatments

Pest: Fungous diseases of rice or internal feeders

Treatment: T303-d-1 Dry heat at 180-200 °F for 2 hours

### **T303-d-2**

#### **Articles made with rice straw**

Pest: Fungous diseases of rice or internal feeders

Treatment: T303-d-2 Steam sterilization

Temperature	Pressure	Exposure Period
260 °F	20 lbs	15 minutes
250 °F	15 lbs	20 minutes

### T303-d-2-1 Articles made with rice straw

Pest: Fungous diseases of rice or internal feeders

Treatment: T303-d-2-1 Steam sterilization, **use T303-b-1**

### T303-d-2-3 Articles made with rice straw for indoor use only

Pest: Internal feeders

Treatment: T303-d-2-3 MB ("Q" label only) at NAP—tarpaulin or chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	4 hrs	24 hrs
60 °F or above	2.5 lbs	30	20	20	15
50-59 °F	3 lbs	36	25	24	20
40-49 °F	4 lbs	48	35	32	25

### T303-d-2-2 Articles made with rice straw for indoor use only

Pest: Internal feeders

Treatment: T303-d-2-2 MB ("Q" label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	2.5 lbs	2.5 hrs
50-59 °F	3.5 lbs	2.5 hrs
40-49 °F	5 lbs	2.5 hrs

### T303-b-1 Rice straw and hulls imported for purposes other than approved processing

Two alternative treatments based on how commodity is packed

Pest: Fungous diseases of rice

Treatment: T303-b-1 Steam sterilization, for closely-packed commodity

Introduce the live steam into a 28" vacuum until pressure reaches 10 lbs and hold for 20 minutes. (Steam sterilization is not practical for the treatment of bales having a density greater than 30 lbs per cubic foot.)

### T303-b-2 Rice straw and hulls imported for purposes other than approved processing

Pest: Fungous diseases of rice

Treatment: T303-b-2 Steam sterilization, for commodity packed as loose masses

As **T303-b-1** or, if without initial vacuum, bleed air until steam vapor escapes.

### **T303-c-1**      **Rice straw and hulls imported in small lots of 25 pounds or less**

Pest:            Fungous diseases of rice

Treatment: T303-c-1 Dry heat at 212 °F for 1 hour

## **T304—Alpha (alfa) Grass and Handicrafts (*Stipa tenacissima*, *Ampelodesma mauritanicus*)**

### **T304-a**      **Alpha (alfa) grass and handicrafts (*Stipa tenacissima*, *Ampelodesma mauritanicus*)**

Two alternative treatments

Pest:            Infested with *Harmolita* spp. (jointworms)

Treatment: T304-a MB at NAP—chamber only

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	2.5 lbs	32 hrs
50-59 °F	3.5 lbs	32 hrs
40-49 °F	4.5 lbs	32 hrs

### **T304-b**      **Alpha (alfa) grass and handicrafts (*Stipa tenacissima*, *Ampelodesma mauritanicus*)**

Treatment: T304-b MB in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	2.5 lbs	2.5 hrs
50-59 °F	3.5 lbs	2.5 hrs
40-49 °F	5 lbs	2.5 hrs

## **T305—Cut Flowers and Greenery**

### **T305-a**      **Cut flowers and greenery**



The “external pests” controlled by this schedule do not include dormant snails. Refer to T201-o-1 through T201-p-3.

Pest: External feeders, leafminers, hitch-hikers, surface pests, and slugs<sup>1</sup>

Treatment: T305-a MB ("Q" label only) at NAP—tarpaulin or chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:	
		0.5 hr	2 hrs
80-89 °F	1.5 lbs	19	12
70-79 °F	2 lbs	24	16
60-69 °F	2.5 lbs	30	20
50-59 °F	3 lbs	36	24
40-49 °F*	3.5 lbs	41	27

\* For leafminers, use the initial dosage rate of 4 lbs/1,000 ft<sup>3</sup>.

## T305-b

### Cut flowers and greenery

Pest: Borers or Soft Scales

Treatment: T305-b MB ("Q" label only) in 15" vacuum



Vacuum fumigation requires prior consent of the importer. If consent denied, refuse entry unless T305-a plus hand removal of these pests is feasible. Vacuum fumigation is not required for soft scales known to be widely distributed in the United States.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80-90 °F	2.5 lbs	2 hrs
70-79 °F	3 lbs	2 hrs
60-69 °F	3 lbs	2.5 hrs
50-59 °F	3 lbs	3 hrs
40-49 °F	3 lbs	3.5 hrs

<sup>1</sup> Quarantine significant slugs of the families Agriolimacidae, Arionidae, Limacidae, Milacidae, Philomycidae, and Veronicellidae, including the following genera: Agriolimax, Arion, Colosius, Deroceras, Diplosolenodes, Leidyula, Limax, Meghimatium, Milax, Pallifera, Pseudoveronicella, Sarasinula, Semperula, Vaginulus, Veronicella  
**Slugs must be treated at 60°F or above (2.5 lbs. or greater)**

## T305-c Cut flowers and greenery

Pest: Mealybugs

Treatment: T305-c MB (“Q” label only) at NAP—tarpaulin or chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:	
		0.5 hr	2 hrs
80 °F or above	2.5 lbs	32	24
70-79 °F	3 lbs	38	29
60-69 °F	4 lbs	48	38

## T306—Bags and Bagging Material, Covers

### T306-a Bags and bagging material or covers used to contain root crops

Pest: *Globodera rostochiensis* (golden nematode)

Treatment: T306-a MB (“Q” label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
40 °F or above	8 lbs	16 hrs
	10.5 lbs	12 hrs
	16 lbs	8 hrs

### T306-b Bags and bagging material or covers used for cotton only

Pest: *Pectinophora spp.*

Treatment: T306-b MB at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> ) for:		Exposure Period
	Bulk shipments	Other than bulk shipments	
60 °F or above	6 lbs	6 lbs	12 hrs
60 °F or above	4 lbs	3 lbs	24 hrs
40-59 °F	7 lbs	7 lbs	12 hrs
40-59 °F	5 lbs	4 lbs	24 hrs

### T306-c-1 Bags and bagging material or covers

Two alternative treatments

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T306-c-1 MB (“Q” label only) at NAP



**Important**

Concentration readings should be obtained within the commodity.  
Concentration readings not required for chamber fumigations.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2 hrs	24 <sup>1</sup> hrs	28 <sup>1</sup> hrs	32 <sup>1</sup> hrs
90 °F or above	4 lbs	48	32	25	—	—
80-89 °F	6 lbs	72	48	30	—	—
70-79 °F	8 lbs	96	64	35	—	—
60-69 °F	12 lbs	144	96	50	—	—
50-59 °F	12 lbs	144	96	50	50	—
40-49 °F	12 lbs	144	96	50	50 <sup>2</sup>	50

- 1 In addition to the space concentration readings, commodity concentration reading must be taken. The minimum concentration reading for commodity reading is as follows: For 90-96 °F—10 oz.; for 80-89 °F—15 oz.; and for 70-79 °F—20 oz.
- 2 Optional

## T306-c-2

### Bags and bagging material or covers

Pest: *Trogoderma granarium* (khapra beetle)

Treatment: T306-c-2 MB (“Q” label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs

## T306-d-1

### Bagging from unroasted coffee beans

Two alternative treatments

Pest: Various

Treatment: T306-d-1 MB (“Q” label only) at NAP



**Important**

Concentration readings should be obtained within the commodity.  
Concentration readings not required for chamber fumigations.

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2 hrs	24* hrs	28* hrs	32* hrs
90 °F or above	4 lbs	48	32	25	—	—
89-89 °F	6 lbs	72	48	30	—	—
70-79 °F	8 lbs	96	64	35	—	—
60-69 °F	12 lbs	144	96	50	—	—
50-59 °F	12 lbs	144	96	50	50	—
40-49 °F	12 lbs	144	96	50	50	50

\* In addition to the space concentration readings, you must take a commodity concentration reading. The minimum concentration reading for commodity reading is as follows: For 90-96 °F—10 oz.; for 80-89 °F—15 oz.; and for 70-79 °F—20 oz.

## T306-d-2

### Bagging from unroasted coffee beans

Two alternative treatments

Pest: Various

Treatment: T306-d-2 MB (“Q” label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	8 lbs	3 hrs
40-59 °F	9 lbs	3 hrs



**Important**

Load limit maximum 75 percent of chamber volume.

## T307—Khapra Beetle Infested Material

### T307-a

#### Feeds and milled products heated as a part of the processing procedure, or other commodities that can be subjected to heat

Pest: Khapra beetle

Treatment: T307-a Heat treatment



This treatment should not be used except when specifically authorized in each case by the Quarantine Policy, Analysis and Support (QPAS), Riverdale, MD, office.

180°F in any part of a processing procedure or at 150°F for a total of 7 minutes, the commodity being moved through or manipulated in the heated area in a manner to ensure that all parts meet the time and temperature requirements.

#### Miscellaneous products infested with Khapra beetle

Pest: Khapra beetle

Treatment: Summary of fumigation treatments for infested material



Bags and bagging, see “T306-c-1” on [page-5-4-16](#)  
Cotton products, see “T301-b-1-1” on [page-5-4-2](#)  
Finely ground oily meals, see “T306-c-1” on [page-5-4-16](#)  
Grains and seeds, see “T302-c-1” on [page-5-4-9](#)  
Flour, see “T306-c-1” on [page-5-4-16](#)  
Sorpative materials, see “T302-g-1” on [page-5-4-8](#).  
Goatskins, lambskins, sheepskins (skins and hides), see “T416” on [page-5-5-45](#)



The following commodities have shown relatively high sorption:  
Carpet backing, Cinnamon quill, Cocoa mats, Cocoa powder, Lumber, Myrobalan, Pistachio nuts, Polymide waste, Potato starch, Rubber (crepe or crude) Vermiculite, Wool (raw, except pulled)

All other commodities, see “T302-g-1” on [page-5-4-8](#)

## T308—Tobacco, for Export

### T308-e

#### Blended strip tobacco for export

Pest: *Lasioderma serricorne* (Cigarette beetle) and *Ephestia elutella* (Tobacco moth)

Treatment: T308-e Vacuum-steam flow method

1. Evacuate the chamber to the wet bulb temperature of 35 °F (0.2 in. Hg. absolute or 29.8 in. Hg. vacuum) to remove air from the tobacco mass and facilitate steam penetration.
2. Introduce steam until 160 °F is reached while maintaining vacuum to evacuate gases pushed ahead of the steam. Hold at 160 °F for 3 minutes to allow the steam to condense within the tobacco mass for the temperature to equilibrate.
3. Re-evacuate to 110 °F.
4. Introduce steam to 135 °F for 3 minutes to allow the steam to condense within the tobacco mass and for the temperature to equilibrate.

### T308-c

#### Leaf tobacco for export

Pest: *Lasioderma serricorne* (Cigarette beetle) and *Ephestia elutella* (Tobacco moth)

Treatment: T308-c Vacuum-steam flow process followed by reconditioning

For leaf tobacco—flowing steam at 170 °F for 15 minutes in 23" vacuum. Followed by reconditioning of the tobacco to 12 to 13 percent moisture content.

### T308-d

#### Stored tobacco for export

Pest: *Lasioderma serricorne* (Cigarette beetle) and *Ephestia elutella* (Tobacco moth)

Treatment: T308-d Kabat<sup>®</sup> (active ingredient—methoprene) is an insect growth regulator applied at the rate of 0.2 pounds (3.9 fluid ounces) per 1,000 pounds of tobacco.

Application should be made directly to tobacco immediately prior to compaction in hogsheads. Assure complete coverage by using multi-directional sprays and tumbling. Kabat<sup>®</sup> may be applied by use of a proportional dilution apparatus or by preparation of a dilute spray solution. Follow mixing and application instructions on the label. Zoecon Corporation will be responsible for ensuring that receivers in foreign countries will accept this treatment in lieu of fumigation.

In most cases, indication of Kabat<sup>®</sup> treatment need not be shown on the phytosanitary certificate. PPQ prefers that tobacco exporting firms utilize the letterhead certification of treatment rather than relying on the phytosanitary certificate to convey this information to foreign receivers. However, if requested, an additional declaration may be made showing application rates as supplied by the exporter if it has been determined through periodic inspection of a firm's facilities that application of the protectant is an integral part of the processing procedure.

**T308-a-1 Tobacco for export (flue-cured and burley in hogshead and cases; turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales)**

Four alternative treatments

Pest: *Lasioderma serricorne* (Cigarette beetle) and *Ephestia elutella* (Tobacco moth)

Treatment: T308-a-1 MB in 28" vacuum

Flue-cured and burley in hogshead and cases; Turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
70 °F or above	4 lbs	4 hrs

**T308-a-2 Tobacco for export (flue-cured and burley in hogshead and cases; turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales)**

Treatment: T308-a-2 MB at NAP—tarpaulin or chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
70 °F or above	1.25 lbs	72 hours
45-69 °F	2 lbs	72 hrs

**T308-b-1 Tobacco for export (flue-cured and burley in hogshead and cases; turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales)**

Treatment: T308-b-1 Phosphine at NAP—Tarpaulin or freight containers

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ppm) At:	
		96 hrs	144 hours
Greater than 68 °F	33 g*	200	—
61-68 °F	33 g*	—	300

\* 33g/1,000 ft<sup>3</sup> is equivalent to 1.17 g/m<sup>3</sup>.



**Important**

The tobacco industry's Sanitation Committee wants to consider “starting time” as the time when the minimum concentration reading is reached. It is recommended that concentration monitoring be done every 6 hours leading up to “starting time,” then again at completion (96 or 120 hours later). [Note that this concept differs from the “starting time” in other phosphine fumigation schedules. In those cases, “starting time” starts when the aluminum phosphide or magnesium phosphide are first introduced.].



Gas concentration readings and temperature readings must be taken in the middle of a tightly packed bale. The fumigation does not begin until the gas concentration readings reach minimum required levels.



Refer to the Equipment Section of this manual for a discussion of the MityVac hand-operated gas sampling pump and the Port-a-sens phosphine monitor. see Table 5-4-52 for data on amount of phosphine liberated by various products.

## T308-b-2

### **Tobacco for export (flue-cured and burley in hogshead and cases; turkish in bales; cigar filler/binder in cases or bales; and cigar wrappers in bales)**

Treatment: T308-b-2 Phosphine at NAP—Warehouses

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ppm) At:	
		96 hrs	144 hours
Greater than 68 °F	20 g*	200	—
61-68 °F	20 g*	—	300

\* 20g/1,000 ft<sup>3</sup> is equivalent to 0.71 g/m<sup>3</sup>.



The tobacco industry's Sanitation Committee wants to consider “starting time” as the time when the minimum concentration reading is reached. It is recommended that concentration monitoring be done every 6 hours leading up to “starting time,” then again at completion (96 or 120 hours later). [Note that this concept differs from the “starting time” in other phosphine fumigation schedules. In those cases, “starting time” starts when the aluminum phosphide or magnesium phosphide are first introduced.]



Gas concentration readings and temperature readings must be taken in the middle of a tightly packed bale. The fumigation does not begin until the gas concentration readings reach minimum required levels.



Refer to [Table 5-4-1 on page-5-4-29](#) for the amount of phosphine liberated by various products

## T309—Broomcorn and Broomcorn Articles

### T309-a Broomcorn and broomcorn articles

Four alternative schedules

Pest: *Ostrinia nubilalis* (European corn borers), ticks, and saw flies

Treatment: T309-a MB in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period for:	
		Sawflies	Other than sawflies
60 °F or above	2.5 lbs	5 hrs	2.5 hrs
50-59 °F	3.5 lbs	5 hrs	2.5 hrs
40-49 °F	5 lbs	5 hrs	2.5 hrs

### T309-b-1 Broomcorn and broomcorn articles

Pest: *Ostrinia nubilalis* (European corn borers), ticks, and saw flies

Treatment: T309-b-1 MB at NAP—chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
60 °F or above	2.5 lbs	16 hrs
50-59 °F	3.5 lbs	16 hrs
40-49 °F	4.5 lbs	16 hrs

### T309-b-2 Broomcorn and broomcorn articles

Pest: *Ostrinia nubilalis* (European corn borers), ticks, and saw flies

Treatment: T309-b-2 MB at NAP—Railroad car, reefer, highway van, tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	4 hrs	24 hrs
60 °F or above	3 lbs	36	24	20	15
50-59 °F	5 lbs	60	40	30	20
40-49 °F	7 lbs	84	56	40	25

### T309-c Broomcorn and broomcorn articles

Pest: *Ostrinia nubilalis* (European corn borers), ticks, and saw flies

Treatment: T309-c Steam sterilization (alternate treatment)

Introduce live steam into 25" vacuum until pressure reaches 10 psi and 240 °F, then hold for 20 minutes.

## T310—Tick-infested Materials (Non-food)

### T310-a

#### Non-food materials

Three alternative treatments

Pest: Ticks

Treatment: T310-a MB ("Q" label only) at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:							
		0.5 hr	2 hrs	3 hrs	4 hrs	5 hrs	7 hrs	8 hrs	16 hrs
90 °F or above	4 lbs	55	32	45	—	—	—	—	—
80-89 °F	5 lbs	65	40	52	—	—	—	—	—
70-79 °F	6 lbs	75	48	—	50	—	—	—	—
60-69 °F	7 lbs	88	56	—	—	60	—	—	—
50-59 °F	8 lbs	100	64	—	—	—	70	—	—
40-49°F	8 lbs	100	—	—	—	—	—	65	50



Always check the fumigant label for the proper dosage used on the commodity being treated.

### T310-b

#### Non-food materials

Treatment: T310-b MB ("Q" label only) in 26" vacuum

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Exposure Period
80 °F or above	3 lbs	2.5 hrs
70-79 °F	3 lbs	3.5 hrs
60-69 °F	4 lbs	4 hrs
50-59 °F	5.5 lbs	5 hrs



For all fumigations with MB, if commodity temperature is known or considered to have been below the temperature range during the previous 48 hours, use the next lower range to calculate dosage.

### T310-c

#### Non-food materials

Treatment: T310-c (***Vacant***)

## T310-d

### Non-food materials

Treatment: T310-d Sulfuryl fluoride at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:		
		0.5 hr	2 hrs	24 hrs
70 °F or above	2 lbs	25	16	20
50-69 °F	2.5 lbs	32	20	24
40-49 °F	3 lbs	40	24	28



Fumigations below 50 °F to be used only on an emergency basis and specifically authorized by Quarantine Policy, Analysis and Support (QPAS) in Riverdale MD.

## T311—Hay, Baled

### T311

#### Baled hay

Pest: *Mayetiola destructor* (Hessian fly), *Oulema melanopus* (cereal leaf beetle)

Treatment: T311 Phosphine at NAP

Temperature	Dosage Rate (g/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		0.5 hr	2 hrs	24 hrs	168 hrs
50 °F or above	60	45	30	15	15

Aerate 24 hours or until a level at or below 0.3 ppm is determined.

see Table 5-4-1 on [page-5-4-29](#) for data on amount of phosphine liberated by various products.

## T312—Oak Logs and Lumber

Oak logs and/or lumber must be aerated for a minimum of 48 hours. Follow aeration procedures under sections [“Aerating Sorptive Commodities in Containers—Indoors and Outdoors” on page-2-4-40](#) and [“Aerating Sorptive, Noncontainerized Cargo—Indoors and Outdoors” on page-2-4-38](#).



An Ascarite® filter must be mounted on the T/C Analyzer when taking concentration readings for the following treatments

### T312-a

#### Oak logs

Pest: Oak Wilt Disease

Treatment T312-a MB (“Q” label only) at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:						
		0.5 hr	2 hrs	12 hrs	24* hrs	36 hrs	48 hrs	72 hrs
40 °F or above	15 lbs	240	240	200	120	160	120	80



\*The minimum concentration at 24 hours must be 120. After taking this reading, add enough fumigant to bring concentration up to 240 oz.

Aerate for 48 hours after treatment. (See [“Aerating Sorptive Commodities in Containers—Indoors and Outdoors” on page-2-4-40](#) and [“Aerating Sorptive, Noncontainerized Cargo—Indoors and Outdoors” on page-2-4-38](#).)

### T312-b

#### Oak lumber

Pest: Oak Wilt Disease

Treatment T312-b MB (“Q” label only) at NAP

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:					
		0.5 hrs	2 hrs	12 hrs	24* hrs	36 hrs	48 hrs
40 °F or above	15 lbs	240	160	100	40	120	80



\*The minimum concentration at 24 hours must be 40. After taking this reading, add enough fumigant to bring concentration up to 240 oz.

Aerate for 48 hours after treatment. (See [“Aerating Sorptive Commodities in Containers—Indoors and Outdoors” on page-2-4-40](#) and [“Aerating Sorptive, Noncontainerized Cargo—Indoors and Outdoors” on page-2-4-38](#).)

## T313—Christmas Trees



Cut trees at least 2 weeks prior to treatment in order to reduce possible damage by the fumigant to the trees.

### T313-a

#### Cut conifer Christmas trees

Pest: *Lymantria dispar* (gypsy moth) egg masses

Treatment: T313-a MB ("Q" label only) at NAP—tarpaulin or chamber

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:				
		0.5 hr	2.5 hrs	3 hrs	4 hrs	4.5 hrs
75 °F or above	1.5 lbs	18	12	—	—	—
70-74 °F	2 lbs	24	16	—	—	—
60-69 °F	2.5 lbs	30	—	24	—	—
60-69 °F	3 lbs	36	24	—	—	—
50-59 °F	3 lbs	36	—	—	24	—
50-59 °F	4 lbs	48	32	—	—	—
40-49 °F	3.5 lbs	42	—	—	—	28
40-49 °F	5 lbs	60	40	—	—	—

## T313-b

### Cut pine Christmas trees and pine logs

Pest: *Tomicus piniperda* (pine shoot beetle)

Treatment: T313-b MB ("Q" label only) at NAP—chamber or tarpaulin

Temperature	Dosage Rate (lb/1,000 ft <sup>3</sup> )	Minimum Concentration Readings (ounces) At:			
		2 hrs	3 hrs	3.5 hrs	4 hrs
60 °F or above	3 lbs	43	—	—	36
60 °F or above	4 lbs	57	48	—	—
50-59 °F	3.5 lbs	50	—	—	42
50-59 °F	4 lbs	57	—	48	—
40-49 °F	4 lbs	57	—	—	48



If treating pine Christmas trees for both gypsy moth egg masses and the pine shoot beetle, use the schedule for the pine shoot beetle since it is more potent.

## T314 - Ash Logs

### T314-a

### *Fraxinus* (Ash Logs, including firewood) from Emerald Ash Borer quarantine areas

Pest: *Agrilus planipennis* (Emerald Ash Borer)

Treatment: T314-a Heat treatment

Heat treatment procedures may employ steam, hot water, kilns, or any other method that raises the temperature of the **center** of the log to at least 160°F (71.1°C) and maintains the center temperature for at least 75 minutes. Procedures for obtaining internal log temperature can be found in the chapter "Methyl Bromide-Tarpaulin", section "[Logs and Lumber](#)" on [page-2-4-16](#).

The heat treatment must be performed at an approved facility. Contact CPHST for a list of approved facilities and temperature monitoring equipment.

**TABLE 5-4-1: Amount of Phosphine Liberated by various Products. Calculate amount of product needed by using the amount of phosphine released as shown in the right column.**

Product	Type	Unit and weight in grams	Grams of phosphine *
Degesch Fumi-Cel®	MP	1 plate; 117.0	33.0
Degesch Fumi-Strip®	MP	16 plates; 1872.0	528.0
Degesch Phostoxin®	AP	1 tablet; 3.0	1.0
Degesch Phostoxin® Tablet Prepac Rope	AP	1 prepac; 99.0 (strip or rope of 33 tablets)	33.0
Detia	AP	1 tablet; 3.0	1.0
Detia Rotox AP	AP	1 pellet; 0.6	0.2
Detia Gas EX-B	AP	1 bag or sachet; 34.0	11.4
Fumiphos tablets	AP	1 tablet; 3.0	1.0
Fumiphos pellets	AP	1 pellet; 0.6	0.2
Fumiphos bags	AP	1 bag; 34.0	11.0
Fumitoxin	AP	1 tablet; 3.0	1.0
Fumitoxin	AP	1 pellet; 0.6	0.2
Fumitoxin	AP	1 bag; 34.0	11.0
Gastoxin	AP	1 tablet; 3.0	1.0
Gastoxin	AP	1 pellet; 0.6	0.2
"L" Fume	AP	1 pellet; 0.5	0.18
	AP	1 pellet; 0.6	0.22
Phos-Kill	AP	1 tablet; 3.0	1.1
Phos-Kill	AP	1 pellet; 0.6	0.22
Phos-Kill	AP	1 bag; 34.0	12.0

\* Reacts with moisture in the air to yield grams of phosphine.

